6. Sound colour

Instrumentation

In this Unit you will discover various aspects of vocal music, the kind of music in which human voices are used alone.

We are going to look at things like the production of human sound , how people communicate with others using articulated sounds, and we will classify human singing voices.

We will also review all the musical instruments and their classification depending on their sound-production and the materials of which they are made, they way they are played and their distribution in a symphony orchestra.

In short, we'll make a complete tour of the sources of musical sounds — voices and instruments.

SECTION 1 MUSICAL CONTEXT

Sometimes you may have noticed that a piece of music sounds "different" depending on the instrument or the voice that interprets it.

This is because each instrument or voice is characterised by unique features that enable you to identify what or who is making a particular sound.

Timbre is the quality of sound that allows you to recognise a type of voice or instrument, even if you close your eyes.

Vocal timbre

THE HUMAN VOICE

First, let's look at the way sound is produced by voices and how we talk, communicate with others and sing.

1. BREATHING

Breathing includes the taking in of air (*inspiration*) and the expulsion of air (*expiration*).

Between these two moments, we retain the air in our lungs (*retention*). This normally involuntary process requires a degree of awareness if we want to have a good vocal technique and sing.

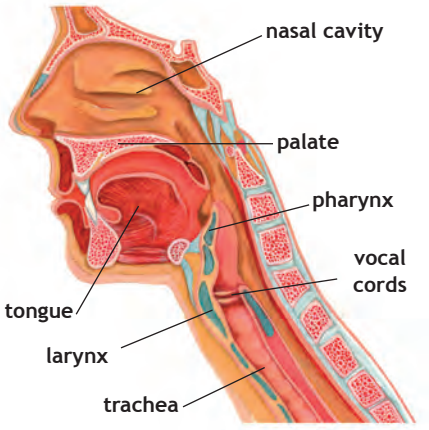
INSPIRATION

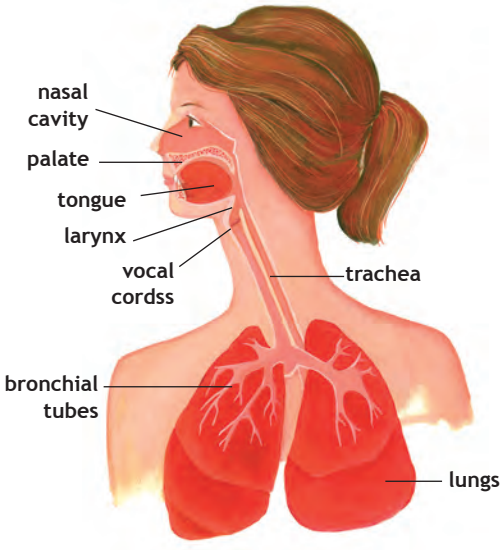
EXPIRATION

2. VOICE PRODUCTION

Our body has a complex mechanism for emitting sound. The larynx houses two elastic tendons called the vocal cords, which vibrate when air is forced out of the lungs.

The larger the amount of air forced out, the louder the voice will be, and the actual sound emitted (higher or lower) depends on the tension of the vocal cords.





3. RESONATORS

Our body acts as a resonating chamber, amplifying and strengthening the sound. The rib cage, trachea, larynx, nose, mouth, forehead and skull are some of the resonators we use to achieve different sound effects.

Now let's look at the **vocal timbres** that enable us to recognise the voice of a singer when we hear it. Voices can be classified according to their **range***.

* **range =** *set of notes that a particular voice can sing.*

You already know that higher voices are generally women's voices, and lower voices are men's. But we can also make a subdivision in both cases, as follows:

1. **Women's and children's voices**
   - a. ***Soprano***: *the highest voice*
   - b. ***Mezzosoprano:*** *intermediate voice*
   - c. ***Contralto:*** *the lowest female voice*
2. **Low voices** *(men's voices)*
   - a. ***Tenor:*** *the highest male voice*
   - b. ***Baritone:*** *the intermediate male voice*
   - c. ***Bass***: *the lowest male voice*

Video 1

Video 2

Composers use different combinations of voices and timbres to give listeners a series of sensations when they produce compositions with voices only (*a cappella*) or combined with instruments (mixed), as you can see in the following video.

Video 3

Instruments

As with voices, musical instruments have different timbres as well. Every instrument can be recognised by its characteristic timbre, thanks to:

1. Physical aspect

This refers to its actual size, because higher sounds are associated with smaller instrument bodies and lower sounds with larger bodies. When you hear a low sound, you associate it with a large-sized instrument, whereas a higher sound is normally associated with a smaller-sized instrument.

Video 4

2. Material used

The material an instrument is made from creates its particular timbre. Some sounds may be delicate, velvety, soft (flutes, clarinets, saxophones...), whereas others may be brighter and stronger (trumpet, trombone, tuba...).

Video 5

And just as human voices are grouped into families, so are the instruments, normally by their similarity in timbre, construction material and the way they produce sounds. So we can establish the following classification of instruments:

I. INSTRUMENTS IN THE STRING FAMILY

The string family comprises instruments from which sound is produced by the vibration of one or more strings, and depending on how the vibration is produced we can establish the following classification:

1.1 Bowed string instruments: in this type of instrument, sound is obtained by rubbing the strings with a bow. In the symphony orchestra, the string section consists of the **violin**, **viola**, **cello** and **contrabass**.

Video 6


violin


viola


violoncello


contrabass

1.2 Plucked string instruments: in this range of instruments we can find:

Video 7

a) instruments in which sound is produced by plucking the strings with a plectrum, such as the **lute**, or by plucking with the fingers, such as the **harp.**


harp


guitar


lute

b) instruments in which sound is produced by plucking the strings with plectrums using a keyboard, i.e. the **harpsichord**.

Video 8


harpsichord

1.3 Struck string instruments: this range includes instruments that produce sound when small hammers strike the strings, triggered by a keyboard. An example of this is the **piano**.

Video 9

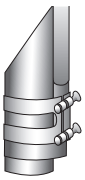
upright piano

grand piano

II. INSTRUMENTS IN THE WIND FAMILY

In this type of instrument, sound is produced by a column of air passing down the inside of a tube. The shorter the length of tube, the higher the sound produced, and vice versa. Depending on their construction material, instruments are divided into the following classifications, or families:

2.1. Woodwind family: these instruments are mostly made from wood, and have reed mouthpieces or bevelled apertures.



Single-reed, like the **clarinet, bass clarinet,** and **saxophone.**

Double reed, as found in the **oboe, bassoon, contrabassoon, English horn**.

Bevelled aperture, such as the **flute** and **piccolo flute**.

Video 10

As you can see, many of these instruments are played using a system of keys or holes, opened and closed by the fingertips. They have a bell or sound outlet pavilion that is quite small, producing a sound that is pleasing, softer and sweeter.

Video 11

bassoon

bass clarinet

English horn

double bassoon

clarinet


flute


piccolo


oboe


saxophone

Within this family there are instruments that are made in metal, such as the saxophone and the flute, but they are included here because of their sound affinity with the other members of the family.

2.2 Instruments in the brass family: these are instruments made of metal or mostly in metal. In these instruments the mouthpiece does not have a reed or bevelled aperture, as in the woodwind family, but rather a cup-shaped mouthpiece made of metal. Brass instruments are operated by a system of valves, or pistons. They have a bell mouth or large horn opening which provides a bright, powerful sound. Within this family we can find the following instruments:

Video 12


trumpet


French horn


trombone


tuba

2.3 Mixed woodwind family: this section includes instruments that cannot be included in any of the above groups due to their particular characteristics. These are instruments that use different ways to make the air vibrate. Here are various examples of these.

Video 13


accordion


harmonica


organ

This family comprises instruments that players hit, shake, scrape or crash against each other, beat with sticks, batons, rods or hammers.

Depending on the type of sound they produce, they can be classified into two groups:

3.1. Percussion instruments with a definite pitch: these are instruments that produce sounds of a specific pitch when they are struck, that is, they have specific notes that can be written on a staff. Among these instruments we can find the following:

3.1.1. Instruments hit with sticks:

a) with wooden plaques: **xylophones** and **marimbas**.

b) with metal plaques: **metallophones, vibraphones, glockenspiels** and **tubular bells**.

c) with a keyboard: **celesta.**

d) with a drumhead: **tympani.**

Video 14

celesta


marimba


vibraphono


tubular bells

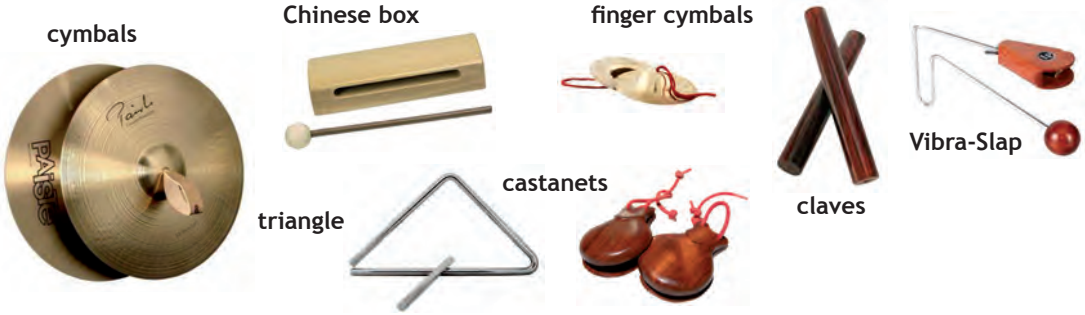

glockenspiel


tympani

3.2. Percussion instruments with an indefinite pitch: this group includes all instruments that are struck, scraped or rubbed to produce sounds of non-specific pitch, meaning a 'musical noise' that cannot be classified as a definite note on the staff. In this range of instruments we can find:

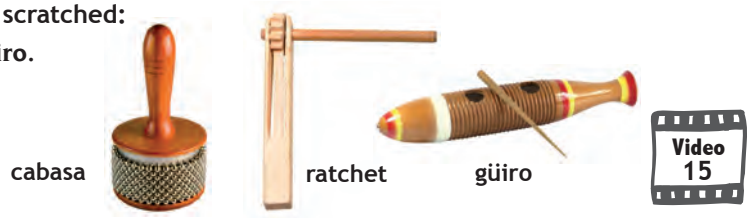
3.2.1 Instruments struck with batons or hands: bass-drum, congas, snare drum, tam-tam, hand drum, tambourine, sleigh bells, gong and **bongos.**

3.2.2 Instruments struck together: triangle, Chinese box, finger-cymbals, claves, castanets, Vibra-Slap and **cymbals.**



3.2.3 Instruments that are shaken: maracas, sleigh bells, whip, rattles and **rainstick**

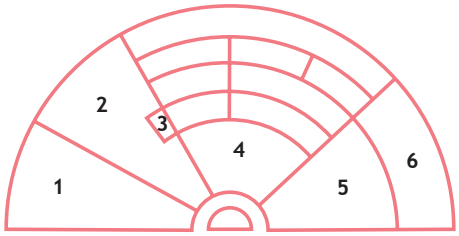
3.2.4 Instruments that are scratched: ratchet, cabasa and **güiro.**



But now let's look at where we can place these instruments on a stage to obtain the optimum 'mix'. This depends on the volume of an instrument and how its placement will influence the overall effect of the orchestra in comparison with instruments that may be louder or quieter.

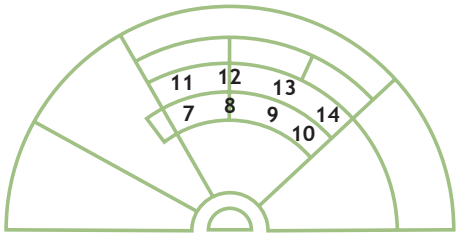
Here you see them visually separated in their locations:

String family



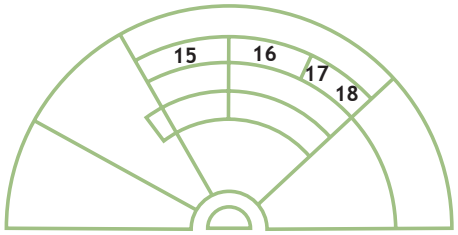
1. First violins
2. Second violins
3. Harp
4. Violas
5. Cellos
6. Contrabasses

Woodwind family



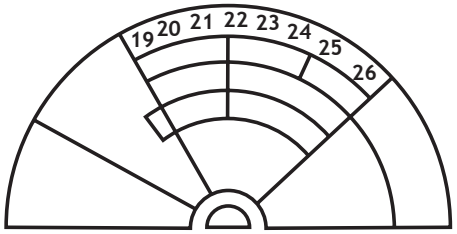
7. Piccolo flute
8. Transverse flute
9. Oboes
10. English horn
11. Clarinets
12. Bass clarinet
13. Bassoons
14. Contrabassoon

Brass family



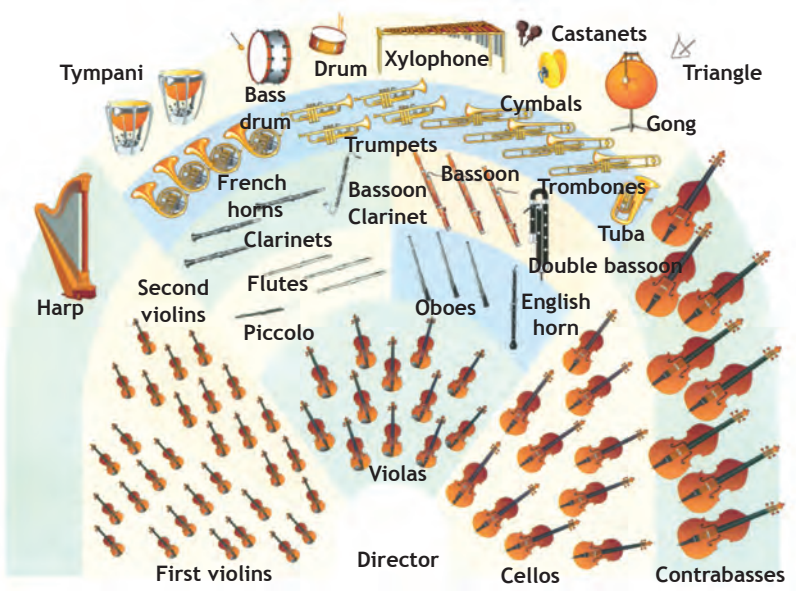
15. French horns
16. Trumpets
17. Trombones
18. Tuba

Percusssion family



19. Bells
20. Glockenspiel
21. Xylophone
22. Tamtan
23. Tympani
24. Snare drum
25. Bass drum
26. Cymbals

Here is a full view of the symphony orchestra with all the families of instruments together:



Video 16

IV. ELECTRONIC INSTRUMENTS

These are instruments that produce sound by electronic means, and therefore need a power source to be plugged in. They were of course invented in the 20th century, and include: the **electric guitar**, the **synthesiser,** the **electric bass** and the **electronic drum set**.

electric guitar

synthesiser

electronic drums

electric bass

Others that are not so well-known include the **Moog synthesiser, the Martenot, Thèremin, the electronic Hammond organ,** and **the dynamophone.**

Video 17

Martenot

theremin

Hammond electric organ

Moog synthesiser

Now do the exercises given in your WORKBOOK.

pages 72-75

Now that you know the various types of musical instruments, let's try to distinguish them by listening to some musical fragments.

Now do the exercises given in your WORKBOOK.

pages 76-82

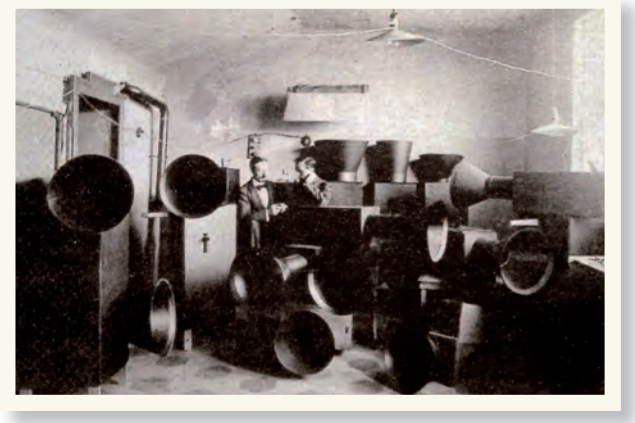
CURIOUSLY ENOUGH

Composers sometimes look for new ways to develop music. Many of them have invented new instruments to re-create sounds from our environment, as they believe that noise is part of human life and this should be present in music.

The Italian composer Russolo invented a musical instrument called the *intonarumori*, which recreates various types of "noise". He has included these noises in his compositions.

Video 18

Intonarumori,
Luiggi Russolo 1914



SECTION 3 CULTURAL CONTEXT

As you will see, the use of instruments has varied over our historical periods, because of social customs and then the birth, development and perfecting of new instruments over the centuries, as you will see below.

5th-14th C

✓ The Middle Ages

- **Religious music** in this period prohibited singing by women and the use of instruments, as this was thought to distract the faithful. Chants are only sung by male voices unaccompanied by music (*a cappella*).
- **Profane music** had both male and female voices, and used percussion and wind and string instruments. The lute (plucked strings) and the wheel vielle (bowed string) are the instruments most frequently used by troubadours and minstrels, who were the first to popularise profane music in this period.

15th-16th C

✓ The Renaissance

- **In religious music** of the Renaissance the prohibitions of the former period were still in effect, and singers were only men, in the *a cappella* style, or occasionally with an organ accompaniment.
- **Profane music** continued with both male and female voices, and used percussion and wind and string instruments. The lute (plucked strings) and the viola (bowed string) are the instruments most frequently used in this period.

1600-1750

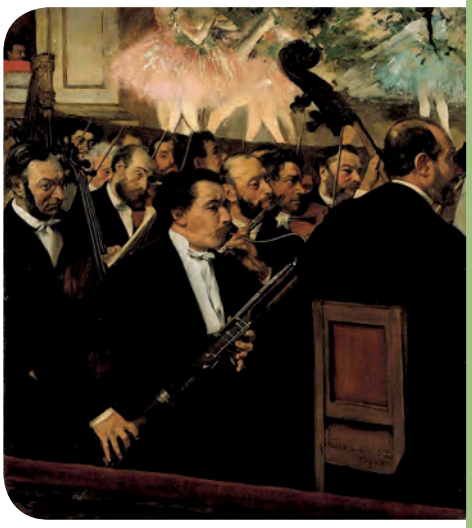
✓ The Baroque

The orchestra layout was not fully formed at this time, and instrumental groups are still small, predominantly bowed string instruments, particularly the violin, and plucked string instruments such as the clavichord, a characteristic of almost all works from this period.

1750-1800

✓ The Classical Period

The orchestra became consolidated, increasing the number of musicians and paying special attention to the colour and sound quality of each section. New instruments appeared such as the clarinet (woodwind) and the pianoforte (struck strings).



19th C

✓ Romanticism

The first large-scale orchestras with over 100 musicians first appear, where the composer carefully selects the most appropriate instruments for expressing the sentiments he wants to convey. New instruments appeared such as the piccolo, English horn, saxophone (woodwind), the piano (struck strings), marimba, celesta (definite pitch percussion), tuba, bombard (brass) and existing instruments were technically improved.

20th-21st C

✓ 20th C to present

Derived from experimentation and innovation and with the advance of new technologies, newly created electronic instruments (synthesiser, Martenot, Thèremin, electronic guitar and bass) were introduced, which along with conventional instruments, eventually practically did away with the tonal music that had existed since the Middle Ages.

Now do the exercises given in your WORKBOOK.

page 83

Video 19

SECTION 4 MUSICAL CREATION

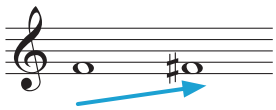
ACCIDENTALS

Accidentals are musical signs that modify the pitch of notes.

1. TYPES OF ACCIDENTALS

SHARP:

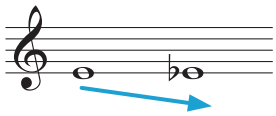
A sharp is indicated by the sign ♯ and it raises the pitch of a note by one semitone.



F♯ is one semitone higher than natural F.

FLAT:

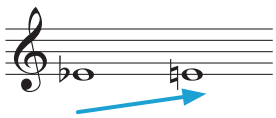
A flat is indicated by the sign ♭ and it lowers the pitch of a note by one semitone.



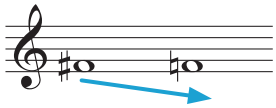
E♭ is one semitone lower than natural E.

NATURAL SING:

A natural note is indicated by the sign ♮ and cancels out the effect of a preceding sharp or flat, restoring the sound to its natural pitch.



The natural sign on the second E cancels the Eb to reinstate the note with its pitch one semitone higher.

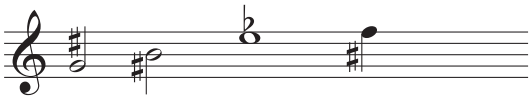


The natural sign on the second F cancels the F# to reinstate the note with its pitch one semitone lower.

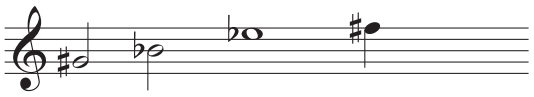
2. PLACEMENT OF ACCIDENTALS

Accidentals are written in specific ways. Here are the basic rules to bear in mind:

Accidentals are placed at the height of the notehead, i.e., on the same line or in the same space as the head of the note.

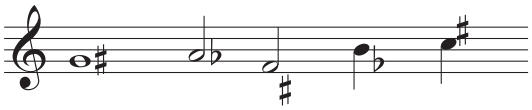


BAD

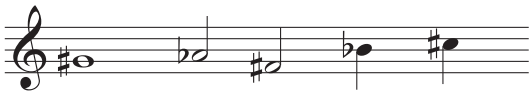


GOOD

They are always written before the note, never behind them, so they sit on the left.



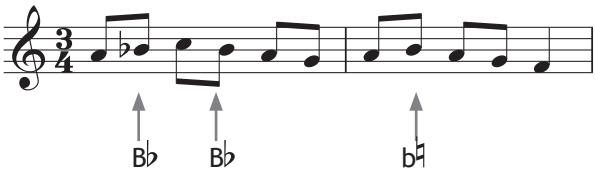
BAD



GOOD

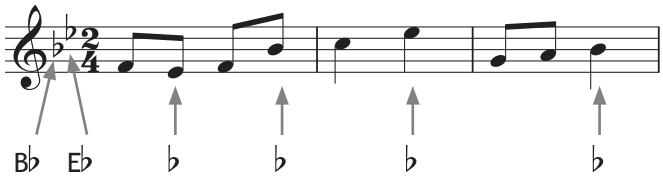
3. ACCIDENTAL MODIFICATIONS AND KEY SIGNATURE ALTERATIONS

- Accidental modifications are those that can appear anywhere throughout the musical score. An accidental only affects notes of the same pitch (or octaves higher or lower) within the same bar. This is to say that if the same note is given in the same bar it will also be affected, but in the next bar this alteration is cancelled.

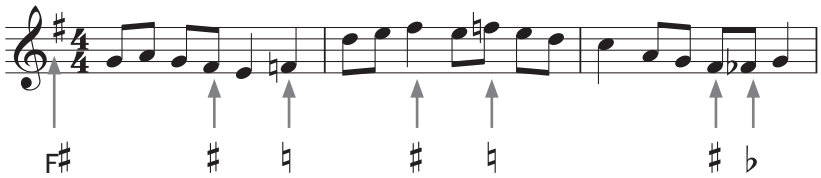


The first B is flattened because the accidental sign indicates this. The second B is also affected because it is in the same bar. But the third B returns to natural because it is in a different bar, and the effect of the accidental is cancelled.

- Notes that are altered in some way, higher or lower, throughout the entire musical piece can be indicated using the key signature. The key signature is placed at the beginning of the score, between the clef and the time signature, indicating that all notes on the line or staff (or octaves higher and lower) are altered throughout the piece or until the next key change. This is the key signature.



Even if there is a key signature affecting, as in the case below, all Fs, accidentals can still occur, but these only alter the notes within the bar-lines.



pages 84-85

Now do the exercises given in your WORKBOOK.

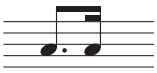
SECTION 5 MUSICAL INTERPRETATION

This section provides activities with melodic instruments that will help you to play and enjoy the music that we offer for interpretation.

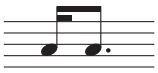
INSTRUMENT PRACTICE

In rhythm with natural notes

You already know that a dotted note is one and half times the time-value of the undotted note. So if a quaver is dotted, it will have the value of a semiquaver, which is half that of a quaver. We are going to practise these new rhythmic figures below:

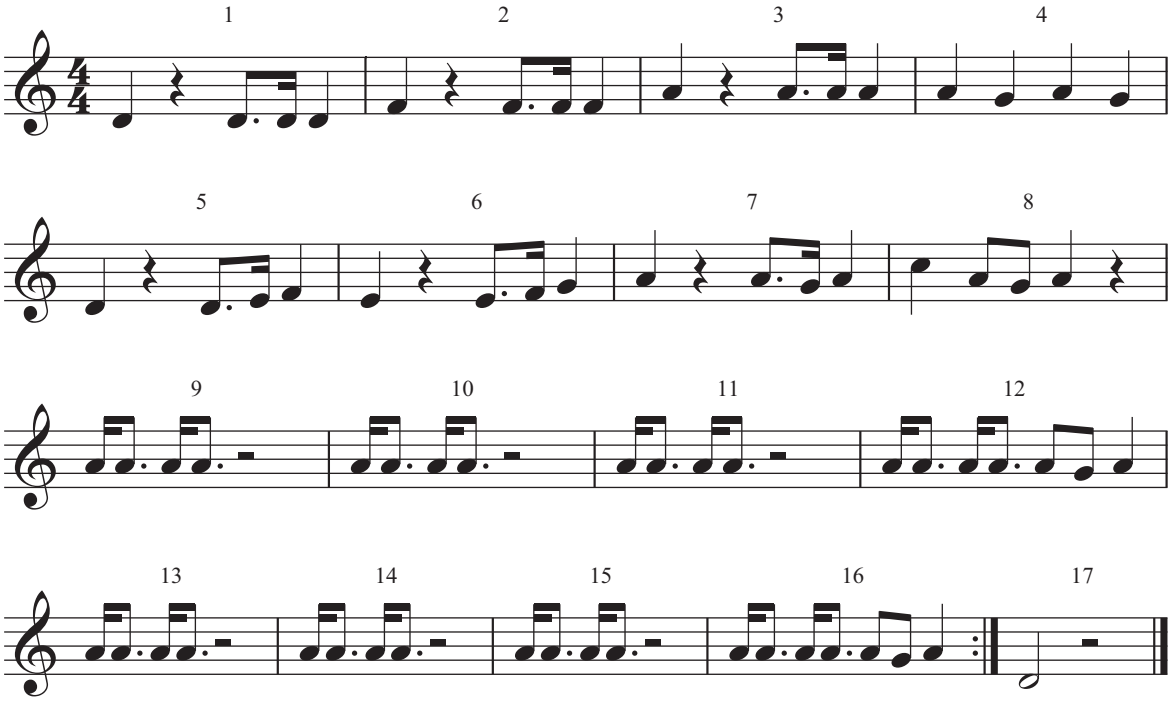


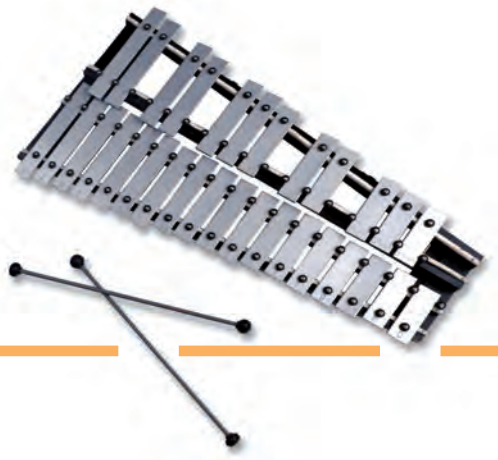
tin ri



ri tin

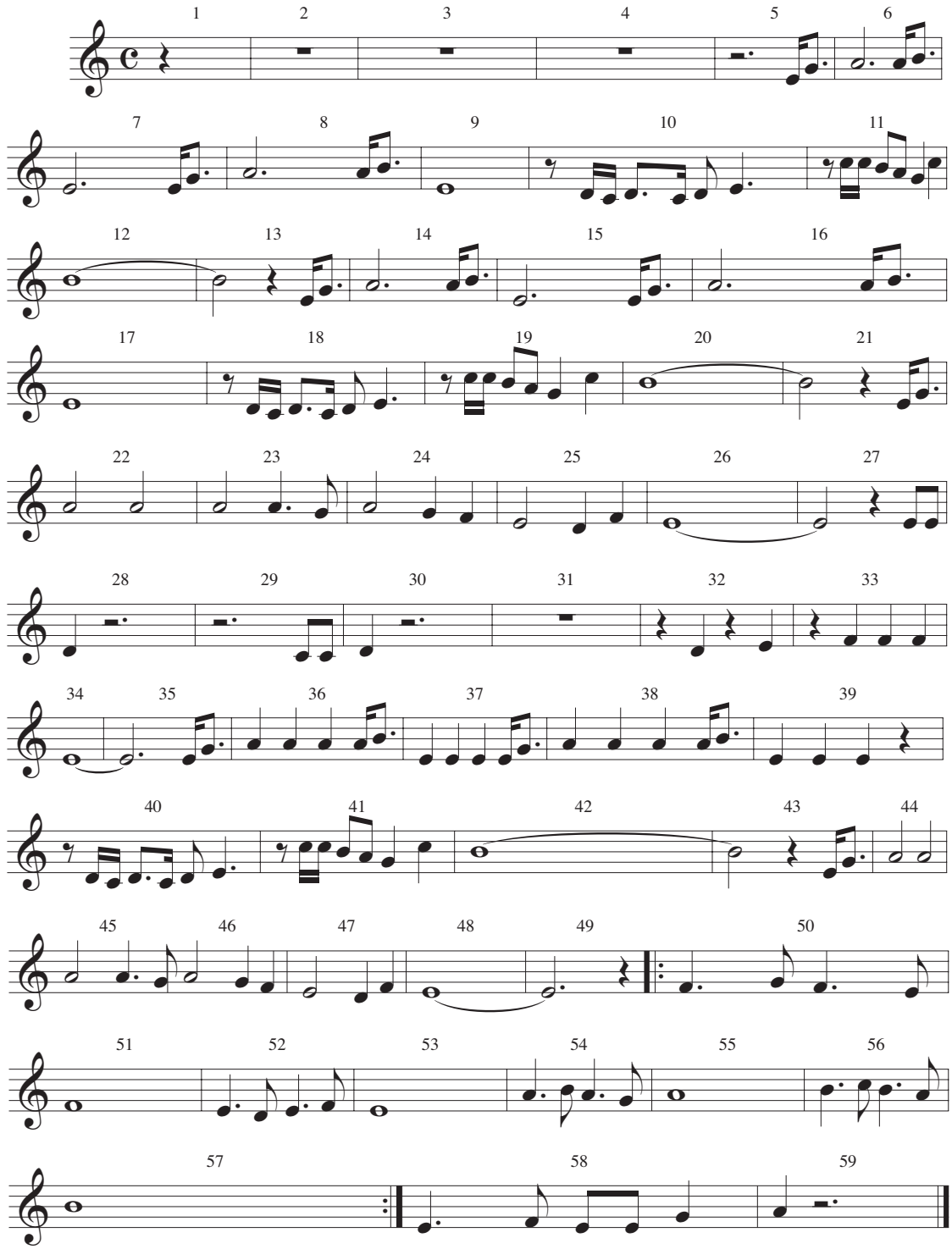
EXERCISE 15





Rocky

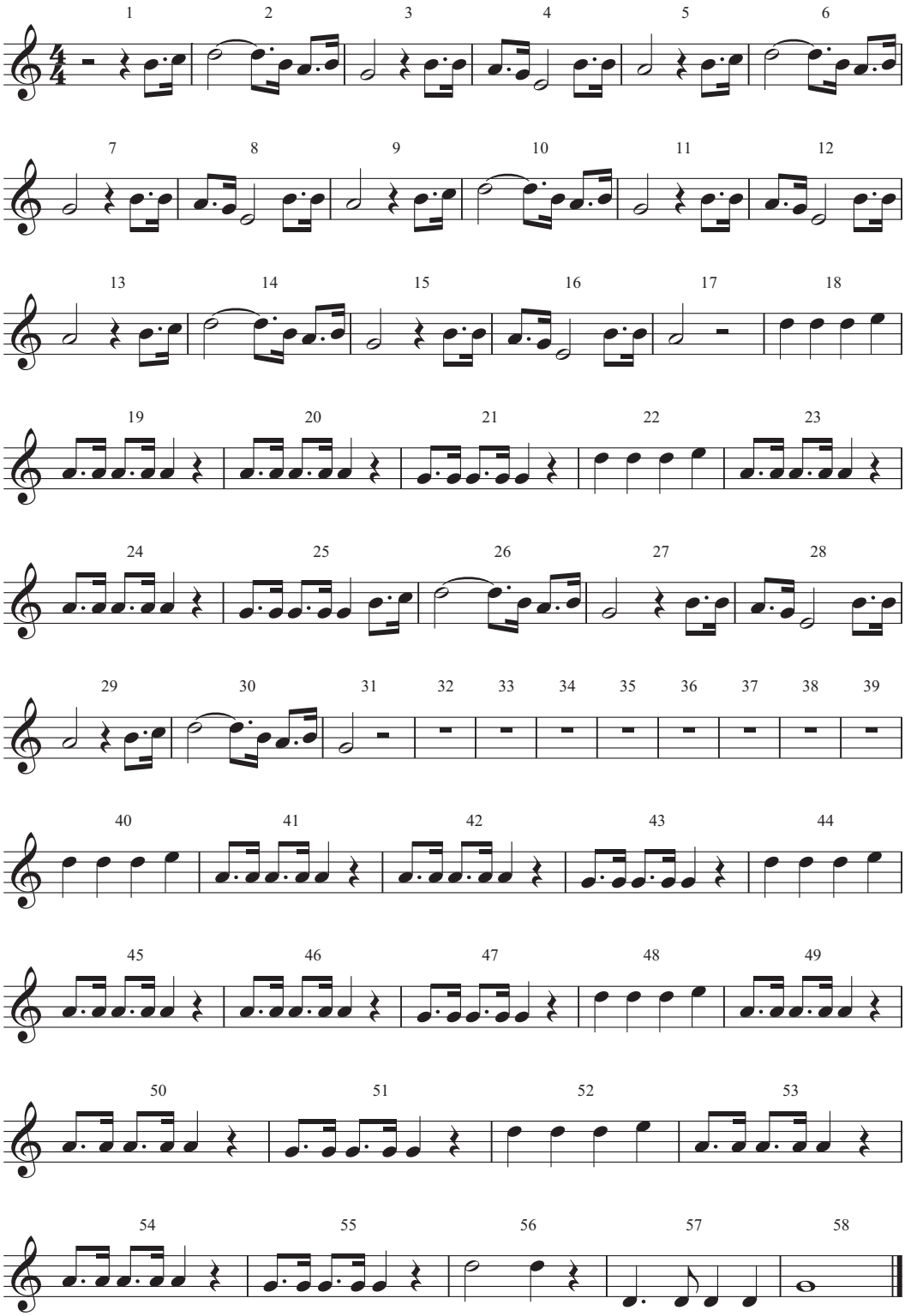
Bill Conti



RECORDER 16

Yellow Submarine

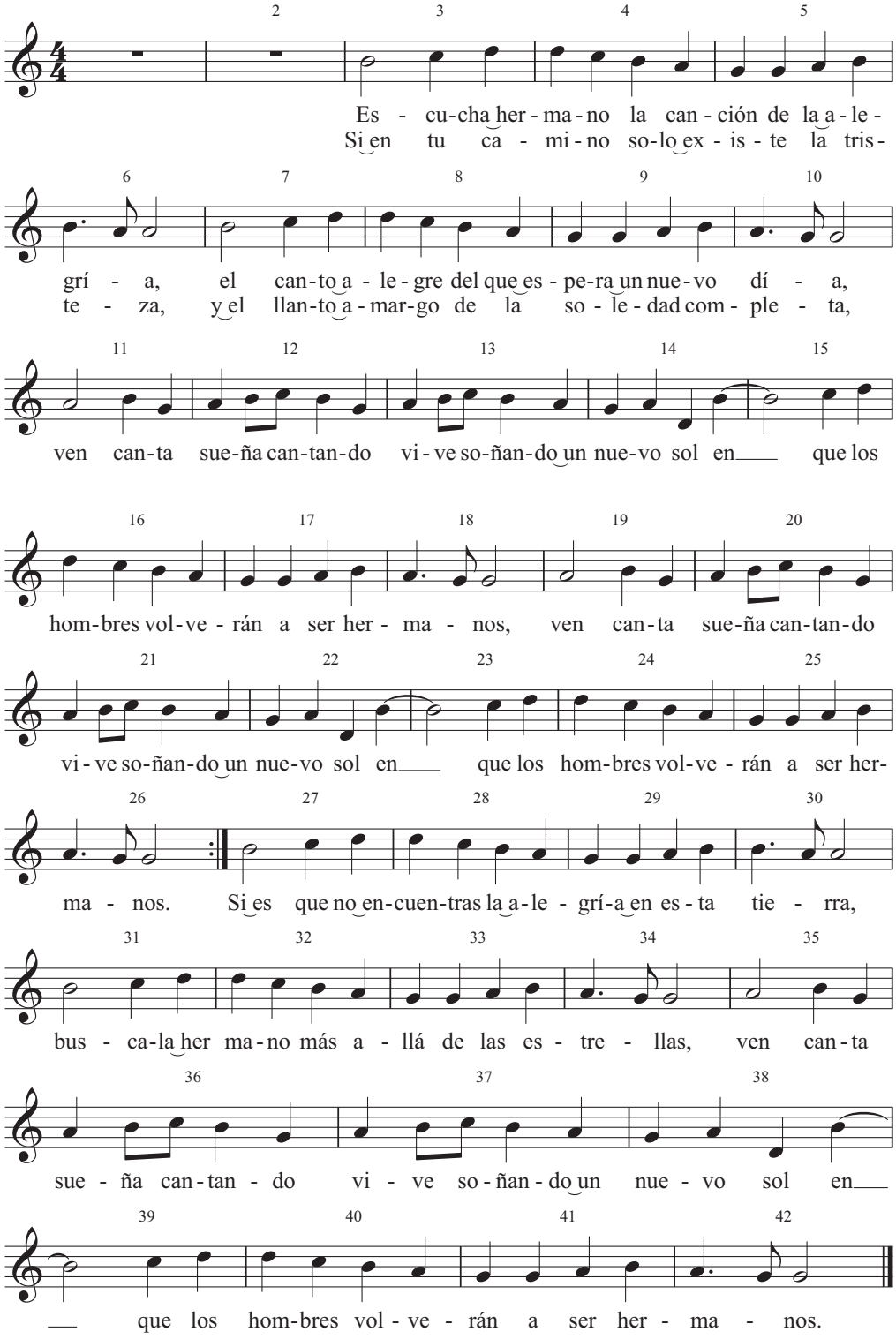
Lennon & McCartney



Ode to Joy

L. Van Beethoven

Recorder 1



The piece you are going to play below is from the German musician Ludwig van Beethoven, an essential composer of the Romantic period, but born in the Classical, because of the passion and pathos contained in his works. This period between 1805 and 1905 was characterised by the expression of sentiments using extremely complicated, passionate and sentimental music.

Curiously enough, this piece has become the European Anthem and an ode to freedom amongst men.

Recorder 2

Ode to Joy

L. Van Beethoven